

1. Inexpensive Methods to Characterize Metal Migration from Mining Sites

APPLICATION OF GEOPHYSICS TO ACID MINE DRAINAGE INVESTIGATIONS. VOLUME 1. LITERATURE REVIEW AND THEORETICAL BACKGROUND

Custis, K., California State Dept. of Conservation, Sacramento

Report No: EPA 530-R-95-013A. NTIS: PB95-191268. 144 pp, 1994

The report evaluates the utility of geophysical techniques in detection and monitoring of acid mine drainage contamination from mine wastes. The document includes a review and summary of literature on geophysical methods that may be useful in evaluating migration of the high specific conductance contaminants in groundwater. The report also briefly discusses the geochemistry of acid mine drainage, the relationship between ion concentration and specific conductance, empirical relationships that are available to predict the resistivity of soil/rock, and formulas for determining the optimum line spacing for geophysical surveys and the associated probabilities.

APPLICATION OF GEOPHYSICS TO ACID MINE DRAINAGE INVESTIGATIONS, VOLUME 2: SITE INVESTIGATIONS

Custis, K., California State Dept. of Conservation, Sacramento

Report No: EPA 530-R-95-013B. NTIS: PB95-191276. 103 pp, 1994

The report describes geophysical field investigations undertaken to evaluate the utility of surface geophysical techniques in detecting and monitoring groundwater pollution from mine waste in the Western United States. The document addresses results of investigations at Spenceville Copper Mine, Leviathan Sulfur Mine, Iron Mountain Copper Mine, and Walker Copper Mine. Methods used in the field investigations included conventional D.C. resistivity, electromagnetic, self potential, and magnetic. It was found that the source and extent of acid mine drainage can be identified, known groundwater flow paths correlate well with geophysical anomalies, subsurface layering of mine waste piles can be mapped with some geophysical methods, and leakage from waste impoundments is detectable by some surface geophysical methods. The document includes maps, charts, and tables.

ENVIRONMENTAL MONITORING OF URANIUM MINING WASTES USING GEOPHYSICAL TECHNIQUES PHASE 1: A COMPARISON AND EVALUATION OF CONDUCTIVITY AND RESISTIVITY METHODS TO MONITOR ACID MINE DRAINAGE FROM URANIUM WASTE ROCK PILES AND TAILINGS AREAS

Koch, R.R., Regulatory Research & Support Program (Canada), Ottawa (Ontario)

NTIS: MIC-97-06440INZ [microfiche]. 165 pp, Feb 1996

Electromagnetic instrumentation from two manufacturers, Geonics Limited of Mississauga, Ontario and Apex Parametrics of Uxbridge, Ontario was selected to carry out conductivity surveys to detect and trace acidic leachate from the Cluff Lake sites. The equipment manufactured by Geonics and utilized for the surveys was the EM-31 and EM-34 terrain conductivity meters. The Apex Parametrics unit was the Max Min 1-8S. The Geopulse resistivity receiver, combined with a central switching unit and a multicore take-out cable, a system manufactured and marketed by Campus Geophysical Instruments Ltd., enabled the rapid measurement of resistivity profiling and sounding data under the control of a lap-top computer.

ENVIRONMENTAL MONITORING OF URANIUM MINING WASTES USING GEOPHYSICAL TECHNIQUES, PHASE II: A COMPARISON AND EVALUATION OF CONDUCTIVITY, RESISTIVITY, GPR AND TDEM SOUNDING METHODS TO MONITOR ACID MINE DRAINAGE FROM URANIUM WASTE ROCK PILES AND TAILINGS AREAS

Koch, R.R.; M. Simpson; P. Giamou

Atomic Energy Control Board, Ottawa

NTIS: MIC-97-07362INZ [microfiche]. 123 pp, 1997

Monitoring of contaminants, from uranium mine waste management facilities, is primarily done by drilling test holes and installing piezometers to sample the subsurface soil and the groundwater. Protocols using geophysical methods of monitoring the migration of acidic leachate from uranium mine waste rock piles and tailings facilities need to be developed. Shallow surface geophysics that include methods such as Electromagnetic (conductivity) and DC Resistivity surveys are less expensive, can locate contaminant plumes both laterally and with depth, providing an areal "snapshot" of the site at any given time. Cluff Lake Mine, a wholly owned project of Cogema Resources Inc. of Saskatoon was selected as the research demonstration site. To study the effects of acidic mine drainage a multi-year program is envisioned. The first phase involved the testing of various off-the-shelf electromagnetic and resistivity equipment over several site locations. Additional phases are required to monitor temporal changes by carrying out repeat surveys to verify the first phase results. Other methods such as ground penetrating radar may be used to supplement the conductivity and resistivity surveys.

PROBE SAMPLING AND GEOPHYSICS APPLIED TO GROUND WATER EVALUATION OF MINE DUMPS

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Tailings and Mine Waste '00. Proceedings of the 7th International Conference, January 2000, Fort Collins, CO

A.A. Balkema, Netherlands. ISBN: 9058091260. p 223-240, 2000

Metals migration into an alpine wetland setting prompted application of Direct Push sampling and installation of nested, multi-level piezometers to evaluate the ground water flow path through mine dumps near the abandoned Waldorf mine near Georgetown CO. Access to the site prohibited use of traditional large scale drill rigs, without significant road modification. A Direct Push Strataprobe(TM) was used to hydraulically advance either a push point or a core sampler to bedrock beneath the dumps, with maximum depths up to 40 feet. In several locations, nested piezometers, with thermister, were installed with short screens at multiple depths. This allowed discrete sampling of ground water and the vertical profiling of water temperature and chemistry. In addition, natural gamma logging was performed to evaluate the potential for using the tool to characterize the lithology while minimizing the number of soil samples taken.

GEOCHEMICAL CHARACTERIZATION OF MOLYBDENUM LEACHING FROM ROCK AND TAILINGS AT THE BRENDA MINESITE, BRITISH COLUMBIA

Morin, K.A.; N.M. Hutt

Proceedings of the 1999 Workshop on Molybdenum Issues in Reclamation, September 24, Kamloops, British Columbia. W.A. Price; B. Hart; C. Howell (eds.)

p 76-85, 1999

TESTING METAL MOBILITY IN SOILS BY ELUTION TESTS
Reuther, Rudolf (ed.)
Geochemical Approaches to Environmental Engineering of Metals
Springer, New York. ISBN: 0387588485. Chapter 2, c1996